

CLAIMS

- 5 1. A medical device comprising:
a support member, a first tubular member and a second tubular member, the
first tubular member being positioned immediately adjacent to at least a portion of the
support member, the second tubular member being positioned immediately adjacent to at
least a portion of the first tubular member;
the support member constructed and arranged to substantially reflect or
substantially transmit radiation at one or more frequencies absorbable by at least one of the
first tubular member and second tubular member.
- 10 2. The medical device of claim 1 wherein the medical device is a catheter.
3. The medical device of claim 2 wherein the support member is a sleeve or a coil.
4. The medical device of claim 2 wherein the support member is made of metal.
5. The medical device of claim 2 wherein the support member is made of a polymeric
material having a melt temperature in excess of the melt temperature of the inner tube.
- 15 6. The medical device of claim 1 wherein the support member is made of a rigid
material.
7. The medical device of claim 1 wherein the support member is made of a flexible
material.
8. The medical device of claim 2 wherein the first tubular member comprises an inside
20 surface and an outside surface, the support member being positioned immediately adjacent to
the inside surface, the second tubular member being positioned immediately adjacent to the
outside surface.
9. The medical device of claim 2 wherein the first tubular member comprises an inside
surface and an outside surface, the support member being positioned immediately adjacent to
25 the outside surface, the second tubular member being positioned immediately adjacent to the
inside surface.
10. The medical device of claim 2 further comprising an outer tube, the support member
being disposed about at least a portion of the outer tube.

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11. The medical device of claim 10 wherein the first tubular member is a medical balloon.
12. The medical device of claim 11 wherein the second tubular member is a first retaining sleeve.
- 5 13. The medical device of claim 12 wherein the first retaining sleeve is welded to the medical balloon.
14. The medical device of claim 13 further comprising an inner tube, the outer tube disposed about at least a portion of the inner tube, the inner tube defining a lumen.
15. The medical device of claim 14 wherein the medical balloon has a proximal end and
10 a distal end, the proximal end extending from the outer tube and the distal end extending from the inner tube.
16. The medical device of claim 14 wherein the catheter comprises an outer tube and an inner tube at least a portion of which is disposed within the outer tube, the support member disposed between the outer tube and the medical balloon.
- 15 17. The medical device of claim 2 wherein at least a portion of at least one of the first tubular member and the second tubular member is radiopaque.
18. The medical device of claim 13 further comprising a retraction device in mechanical communication with the first retaining sleeve, the retraction device extending to the proximal end of the medical device.
- 20 19. The medical device of claim 13 wherein at least a portion of the medical balloon defines a receiving region for an expandable medical device, the receiving region being adjacent to the first retaining sleeve, the region constructed and arranged to receive an expandable medical device thereabout.
20. The medical device of claim 19 wherein the expandable medical device is a stent.
- 25 21. A method of affixing a first tubular member to a second tubular member comprising the steps of:
 - a) providing a support member, a first tubular member and a second tubular member;
 - b) disposing at least a portion of the first tubular member about at least a portion of the support member;

c) disposing at least a portion of the second tubular member about at least a portion of the first tubular member;

d) directing at the first tubular member and the second tubular member sufficient radiation at a first wavelength absorbable by the first tubular member and the second tubular member, wherein the support member does not substantially absorb radiation at the first wavelength.

22. A method of affixing a retaining sleeve to a catheter comprising the steps of:

a) providing a catheter having

1) an outer shaft assembly having a sleeve receiving region;

2) an inner tube extending within the outer shaft assembly, the inner tube having a proximal end and a distal end;

3) an inflation lumen extending within the outer shaft assembly

4) a support member disposed about the inflation lumen at the retaining sleeve receiving region of the outer shaft assembly;

b) disposing a sleeve about at least a portion of the outer shaft assembly in the retaining sleeve receiving region;

c) directing at the sleeve and outer shaft assembly sufficient radiation at a first wavelength absorbable by the sleeve and outer shaft to affix the sleeve to the at least a portion of the outer shaft assembly.

23. The method of claim 22 wherein the support member does not substantially absorb radiation at the first wavelength.

24. The method of claim 23 wherein the support member substantially reflects or substantially transmits radiation at the first wavelength.

25. The method of claim 24 wherein the support member is a sleeve member.

26. The method of claim 24 wherein the support member is a coil.

27. The method of claim 24 wherein the support member is made of metal.

28. The method of claim 24 wherein the outer shaft assembly comprises an outer tube and a medical balloon, the medical balloon disposed about at least a portion of the outer tube

in the retaining sleeve receiving region and the retaining sleeve affixed to at least a portion of the medical balloon.

29. The method of claim 28 wherein the support member is disposed between the medical balloon and the outer tube.

5 30. The method of claim 28 wherein the outer tube has a passage therethrough and the support member is disposed in the passage.

31. The method of claim 30 wherein the support member is in the form of a region of the outer tube having a composition which differs from the composition of the remainder of the outer tube.

10 32. The method of claim 31 wherein regions of the outer tube adjacent to the support member are dyed and the support member is not dyed.

33. A method of laser welding a member to a tube in the production of a medical catheter comprising the steps of:

- 15 providing a tube for use in a medical catheter, the tube having a welding region;
providing a first member to be welded to the tube at the welding region;
providing a laser operable at a laser frequency which is absorbed by the tube and by the first member;
providing a support member in the welding region of the tube, the support member not substantially absorbing radiation at the laser frequency; and
20 directing radiation at the first member and welding region of the tube to weld the first member to the tube.

34. The method of claim 33 wherein the support member is substantially transparent or substantially reflective at the laser frequency.

25 35. The method of claim 34, the tube having a proximal end and a distal end, the tube having a balloon disposed at the distal end thereof, the first member in the form of a retaining sleeve, wherein the retaining sleeve is welded to the balloon.

36. The method of claim 33 wherein the tube is a hypotube and the first member is a manifold.

37. The method of claim 33 wherein the tube is a hypotube and the first member is a midshaft tube.
38. The method of claim 33 wherein the tube is a outer tube having a proximal end and a distal end and a port therein between the proximal end and the distal end for receiving a
5 guidewire therein and the first member is an inner tube extending within the outer tube, the inner tube having a proximal end and a distal end, the proximal end terminating at the port.
39. The medical device of claim 1 wherein the support member is removable from the first tubular member.
40. The medical device of claim 1 wherein the support member is at least partially coated
10 with a release agent.
41. The medical device of claim 1 wherein the support member is braided.
42. The medical device of claim 1 wherein the support member is comprised of a plurality of braids.
43. The medical device of claim 1 wherein the support member is constructed at least
15 partially from hypotubing.
44. The medical device of claim 1 wherein the support member is comprised of a substantially flat ribbon of material.
45. The medical device of claim 4 wherein the support member is constructed by a sputtering process, the sputtering process depositing a thin layer of the metal about a portion
20 of the first tubular member.
47. The medical device of claim 4 wherein the metal is radiopaque.
49. The medical device of claim 6 wherein the support member includes a wall surface with at least one slot therein.
50. The medical device of claim 10 wherein the support member is integral with at least
25 a portion of the outer tube of the catheter assembly.
51. The medical device of claim 10 wherein the support member is extruded with the outer tube of the catheter assembly.
52. The medical device of claim 50 wherein the first support member is a coil or a braid.

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53. A medical device delivery system comprising:
a catheter assembly having a first retaining sleeve receiving region and a medical device receiving region;
an expandable medical device disposed about the medical device receiving region of the catheter assembly, the expandable medical device having a first end and a second end;
a first retaining sleeve disposed about the first end of the expandable medical device and the catheter assembly; and
a first support member disposed coaxially about the first retaining sleeve receiving region of the catheter assembly.
- 10 54. A medical device comprising:
a catheter assembly having a first tubular member disposed about at least a portion of the catheter assembly; and
a first support member positioned immediately adjacent to the first tubular member receiving region of the catheter assembly, the first support member constructed and arranged
15 to substantially reflect or substantially transmit radiation at one or more frequencies absorbable by the first sleeve member.